

Listing of Claims

1-21. (Cancelled)

22. (Currently Amended) A porous support surface bearing a polymeric coating prepared according to a method comprising the steps of:

- a) providing a porous support surface;
- b) providing a nonpolymeric grafting reagent comprising at least two photoinitiator groups, the grafting reagent having one or more substituents comprising positively charged groups;
- c) providing at least one polymerizable monomer solution to be contacted with the surface, in the presence of the grafting reagent, and to be polymerized upon activation of the photoinitiator; and
- d) applying the grafting reagent and monomer solution to the surface to coat the surface with the grafting reagent and to cause the polymerization of monomers to the surface upon activation of the grafting reagent,
wherein the polymeric coating is covalently attached to the surface by the residues of one or more photoinitiator groups provided by the grafting reagent and the polymeric coating is less than about 100 nanometers in thickness and a desired porosity of the porous support surface is preserved after the polymerization of the monomers.

23-28. (Cancelled)

29. (Currently Amended) A porous support surface bearing a polymeric coating prepared according to a method of forming a polymeric coating on a support surface, the method comprising:

- a) providing a porous support surface;

- b) providing a nonpolymeric grafting reagent comprising at least two photoinitiator groups, at least one of which to be activated in order to covalently attach the grafting reagent to the surface itself, and further comprising one or more ~~constituents~~ substituents comprising positively charged groups;
- c) providing at least one polymerizable monomer solution to be contacted with the surface, in the presence of the grafting reagent, and to be polymerized upon activation of the grafting reagent; and
- d) applying the grafting reagent and monomer solution to the surface to coat the surface with the grafting reagent and to cause the polymerization of monomers to the surface upon activation of the grafting reagent and the covalent attachment of the reagent to the surface, wherein the polymeric coating is less than about 100 nanometers in thickness wherein a desired porosity of the porous support surface is preserved after the polymerization of the monomers.

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3 ~~30~~. (Previously presented) A porous surface according to claim ²⁹ wherein the support surface comprises a material selected from the group consisting of polyolefins, polystyrenes, poly(alkyl)methacrylates and poly(alkyl) acrylates, polyacrylonitriles, poly(vinylacetates), poly(vinyl alcohols), chlorine-containing polymers such as poly(vinyl) chloride, polyoxymethylene, polycarbonates, polyamides, polyimides, polyurethanes, polyvinylidene difluoride (PVDF), phenolics, amino-epoxy resins, polyesters, silicones, polyethylene terephthalates (PET), polyglycolic acids (PGA), poly-(p-phenylene-terephthalamides), polyphosphazenes, polypropylenes, parylenes, silanes, and silicone elastomers, as well as copolymers and combinations thereof, and
the grafting reagent is selected from:

ethylenebis(4-benzoylbenzyldimethylammonium) dibromide (Diphoto-Diquat); hexamethylenebis(4-benzoylbenzyldimethylammonium) dibromide (Diphoto-Diquat); 1,4-bis(4-benzoylbenzyl)-1,4-dimethylpiperazinediium dibromide (Diphoto-Diquat); bis(4-benzoylbenzyl)hexamethylenetetraminium dibromide (Diphoto-Diquat); bis[2-(4-benzoylbenzyldimethylammonio)ethyl]-4-benzoylbenzylmethylammonium tribromide (Triphoto-Triquat); 4,4-bis(4-benzoylbenzyl)morpholinium bromide (Diphoto-Monoquat); ethylenebis[(2-(4-benzoylbenzyldimethylammonio)ethyl)-4-benzoylbenzylmethylammonium] tetrabromide (Tetraphoto-Tetraquat); and 1,1,4,4-tetrakis(4-benzoylbenzyl)piperazinediium Dibromide (Tetraphoto-Diquat) and analogues thereof, and

wherein the polymer is formed by the polymerization of polymerizable monomers selected from:

- a) neutral hydrophilic structural monomers selected from acrylamide, methacrylamide, N-alkylacrylamides, N-vinylpyrrolidinone, N-vinylacetamide, N-vinyl formamide, hydroxyethylacrylate, hydroxyethylmethacrylate, hydroxypropyl acrylate or methacrylate, glycerolmonomethacrylate, and glycerolmonoacrylate;
- b) negatively charged hydrophilic functional monomers selected from acrylic acid, methacrylic acid, maleic acid, fumaric acid, itaconic acid, AMPS (acrylamidomethylpropane sulfonic acid), vinyl phosphoric acid, vinylbenzoic acid; and
- c) positively charged monomers selected from 3-aminopropylmethacrylamide (APMA), methacrylamidopropyltrimethylammonium chloride (MAPTAC), N,N-dimethylaminoethylmethacrylate, N,N-diethylaminoethylacrylate.

31-35. (Cancelled)

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36. (Currently Amended) A device comprising a surface bearing a polymer coating formed according a method comprising the steps of:

- a) providing a support surface;
- b) providing a nonpolymeric grafting reagent comprising at least two photoinitiator groups, the grafting reagent having one or more substituents comprising positively charged groups;
- c) providing at least one polymerizable monomer solution to be contacted with the surface, in the presence of the grafting reagent, and to be polymerized upon activation of the photoinitiator; and
- d) applying the grafting reagent and monomer solution to the surface to coat the surface with the grafting reagent and to cause the polymerization of monomers to the surface upon activation of the grafting reagent, wherein the support surface comprises a porous support surface and the polymer coating is covalently attached to the surface by the residues of one or more latent reactive groups provided by the grafting reagent and the polymer coating is less than about 100 nanometers in thickness and a desired porosity of the porous support surface is preserved after the polymerization of the monomers.

5 37-41. (Cancelled)

42. (Currently Amended) A device comprising a surface bearing a polymer coating, the polymer coating being formed by a method comprising the steps of:

- a) providing a porous support surface;
- b) providing a nonpolymeric grafting reagent comprising at least two photoinitiator groups, at least one of which is to be activated in order to covalently attach the grafting reagent

to the surface itself, and further comprising one or more ~~constituents~~ substituents comprising positively charged groups;

c) providing at least one polymerizable monomer solution to be contacted with the surface, in the presence of the grafting reagent, and to be polymerized upon activation of the grafting reagent; and

d) applying the grafting reagent and monomer solution to the surface to coat the surface with the grafting reagent and to cause the polymerization of monomers to the surface upon activation of the grafting reagent and the covalent attachment of the reagent to the surface, wherein the polymer coating is less than about 100 nanometers in thickness wherein a desired porosity of the porous support surface is preserved after the polymerization of the monomers, and further wherein the support surface comprises a material selected from the group consisting of polyolefins, polystyrenes, poly(alkyl)methacrylates and poly(alkyl) acrylates, polyacrylonitriles, poly(vinylacetates), poly(vinyl alcohols), chlorine-containing polymers such as poly(vinyl) chloride, polyoxymethylene, polycarbonates, polyamides, polyimides, polyurethanes, polyvinylidene difluoride (PVDF), phenolics, amino-epoxy resins, polyesters, silicones, polyethylene terephthalates (PET), polyglycolic acids (PGA), poly-(p-phenyleneterephthalamides), polyphosphazenes, polypropylenes, parylenes, silanes, and silicone elastomers, as well as copolymers and combinations thereof, and

the grafting reagent is selected from:

ethylenebis(4-benzoylbenzyldimethylammonium) dibromide (Diphoto-Diquat); hexamethylenebis(4-benzoylbenzyldimethylammonium) dibromide (Diphoto-Diquat); 1,4-bis(4-benzoylbenzyl)-1,4-dimethylpiperazinium dibromide (Diphoto-Diquat); bis(4-benzoylbenzyl)hexamethylenetetraminium dibromide (Diphoto-Diquat); bis[2-(4-

benzoylbenzyldimethylammonio)ethyl]-4-benzoylbenzylmethyammonium tribromide
(Triphoto-Triquat); 4,4-bis(4-benzoylbenzyl)morpholinium bromide (Diphoto-Monoquat);
ethylenebis[(2-(4-benzoylbenzyldimethylammonio)ethyl)-4-benzoylbenzylmethyammonium]
tetrabromide (Tetraphoto-Tetraquat); and 1,1,4,4-tetrakis(4-benzoylbenzyl)piperazinediium
Dibromide (Tetraphoto-Diquat), and analogues thereof, and

wherein the polymer is formed by the polymerization of polymerizable monomers
selected from:

- a) neutral hydrophilic structural monomers selected from acrylamide,
methacrylamide, N-alkylacrylamides, N-vinylpyrrolidinone, N-vinylacetamide, N-vinyl
formamide, hydroxyethylacrylate, hydroxyethylmethacrylate, hydroxypropyl acrylate or
methacrylate, glycerolmonomethacrylate, and glycerolmonoacrylate;
- b) negatively charged hydrophilic functional monomers selected from acrylic acid,
methacrylic acid, maleic acid, fumaric acid, itaconic acid, AMPS (acrylamidomethylpropane
sulfonic acid), vinyl phosphoric acid, vinylbenzoic acid; and
- c) positively charged monomers selected from 3-aminopropylmethacrylamide
(APMA), methacrylamidopropyltrimethylammonium chloride (MAPTAC), N,N-
dimethylaminoethylmethacrylate, N,N-diethylaminoethylacrylate,
and combinations thereof.

6 43. (Currently Amended) A device comprising a surface bearing a polymer coating
formed according a method comprising the steps of:

- a) providing a support surface;

- b) providing a nonpolymeric grafting reagent comprising at least two photoinitiator groups, the grafting reagent having one or more substituents comprising positively charged groups;
- c) providing at least one polymerizable monomer solution to be contacted with the surface, in the presence of the grafting reagent, and to be polymerized upon activation of the photoinitiator; and
- d) applying the grafting reagent and monomer solution to the surface to coat the surface with the grafting reagent and to cause the polymerization of monomers to the surface upon activation of the grafting reagent, wherein the support surface comprises a porous support surface and the polymer coating is covalently attached to the surface and the polymer coating is less than about 100 nanometers in thickness and a desired porosity of the porous support surface is preserved after the polymerization of the monomers.

44-45. (Cancelled)

7 ~~46.~~ (Currently Amended) A support surface bearing a polymeric coating prepared according to a method comprising the steps of:

- a) providing a support surface;
- b) providing a nonpolymeric grafting reagent comprising four photoinitiator groups, the grafting reagent having a nonpolymeric core molecule with the four photoinitiator groups attached to the core molecule;
- c) providing at least one polymerizable monomer to be contacted with the surface, in the presence of the grafting reagent, and to be polymerized upon activation of at least one of the photoinitiator groups; and

d) applying the grafting reagent and monomer solution to the surface to coat the surface with the grafting reagent and to cause the polymerization of monomers to the surface upon activation of the grafting reagent, wherein the support surface comprises a porous support surface and the polymeric coating is less than about 100 nanometers in thickness and a desired porosity of the porous support surface is preserved after the polymerization of the monomers, and the polymeric coating is covalently attached to the surface.

47-54. (Cancelled)

8 55. (Currently Amended) A porous surface according to claim 46-54 wherein the support surface comprises a material selected from the group consisting of polyolefins, polystyrenes, poly(alkyl)methacrylates and poly(alkyl) acrylates, polyacrylonitriles, poly(vinylacetates), poly(vinyl alcohols), chlorine-containing polymers such as poly(vinyl chloride, polyoxymethylene, polycarbonates, polyamides, polyimides, polyurethanes, polyvinylidene difluoride (PVDF), phenolics, amino-epoxy resins, polyesters, silicones, polyethylene terephthalates (PET), polyglycolic acids (PGA), poly-(p-phenyleneterephthalamides), polyphosphazenes, polypropylenes, parylenes, silanes, and silicone elastomers, as well as copolymers and combinations thereof, and

the grafting reagent is selected from:

tetrakis (4-benzoylbenzyl ether), the tetrakis (4-benzoylbenzoate ester) of pentaerythritol, and an acylated derivative of tetraphenylmethane, and

wherein the polymer is formed by the polymerization of polymerizable monomers selected from:

a) neutral hydrophilic structural monomers selected from acrylamide, methacrylamide, N-alkylacrylamides, N-vinylpyrrolidinone, N-vinylacetamide, N-vinyl

formamide, hydroxyethylacrylate, hydroxyethylmethacrylate, hydroxypropyl acrylate or methacrylate, glycerolmonomethacrylate, and glycerolmonoacrylate;

- b) negatively charged hydrophilic functional monomers selected from acrylic acid, methacrylic acid, maleic acid, fumaric acid, itaconic acid, AMPS (acrylamidomethylpropane sulfonic acid), vinyl phosphoric acid, vinylbenzoic acid;
- c) positively charged monomers selected from 3-aminopropylmethacrylamide (APMA), methacrylamidopropyltrimethylammonium chloride (MAPTAC), N,N-dimethylaminoethylmethacrylate, N,N-diethylaminoethylacrylate; and
- d) macromeric polymerizable molecule selected from poly(ethylene glycol)monomethacrylate, methoxypoly(ethylene glycol)monomethacrylate, poly(ethylene glycol)monoacrylate, methacrylamidopoly(acrylamide), poly(acrylamide-co-3-methacrylamidopropylacrylamide), poly(vinylalcohol)methacrylate, poly(vinylalcohol)acrylate, poly(vinylalcohol)dimethacrylate,
and combinations thereof.